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**Committee on the Peaceful  
Uses of Outer Space**  
**Scientific and Technical Subcommittee**  
**Forty-ninth session**  
Vienna, 6-17 February 2012  
Item 14 of the draft provisional agenda\*  
**Long-term sustainability of outer space activities**

## **Long-term sustainability of outer space activities**

### **Note by the Secretariat**

The present conference room paper contains the full report received by the Secretariat from International Telecommunication Union. A summary of the report is contained in document A/AC.105/C.1/103/Add.1.

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\* A/AC.105/C.1/L.310.



## II. Replies received from United Nations entities and intergovernmental bodies

### ITU Radio Regulatory Framework for Space Services

The rights and obligations of the Member States of ITU in the domain of international frequency management of the spectrum/orbit resource are incorporated in the Constitution (CS) and Convention (CV) of the ITU and in the Radio Regulations (RR) that complement them. These instruments contain the main principles and lay down the specific regulations governing the following major elements:

- frequency spectrum allocations to different categories of radiocommunication services;
- rights and obligations of member administrations in obtaining access to the spectrum/orbit resource;
- international recognition of these rights by recording frequency assignments and, as appropriate, any associated orbits, including the geostationary-satellite orbits (GSO), used or intended to be used in the Master International Frequency Register (MIFR).

The above regulations are based on the main principles of efficient use of and equitable access to the spectrum/orbit resource- laid down in provision No. **196** of the ITU Constitution (Article **44**), which stipulates that “*In using frequency bands for radio services, Members States shall bear in mind that radio frequencies and any associated orbits, including the geostationary-satellite orbit, are limited natural resources and that they must be used rationally, efficiently and economically, in conformity with the provisions of the Radio Regulations, so that countries or groups of countries may have equitable access to those orbits and frequencies, taking into account the special needs of the developing countries and the geographical situation of particular countries*”. As indicated in the above provision, further detailed regulations and procedures governing spectrum/orbit use are contained in the Radio Regulations, which is a binding international treaty (No. **31** of the ITU Constitution).

Specific procedures have been established to ensure international recognition of the frequencies used and to safeguard the rights of administrations when they comply with those procedures.

The fact that the ITU Constitution and Convention and the Radio Regulations that complement them are *intergovernmental treaties ratified by governments* — means that those governments undertake:

- to apply the provisions in their countries; and
- to adopt adequate national legislation that includes, as the basic minimum, the essential provisions of this international treaty.

The international Radio Regulations are nevertheless oriented mainly towards matters of a global or regional character, and in many areas there is scope for making special arrangements on a bilateral or multilateral basis.

## 1. Introduction

Over the last 40 years, the space regulatory framework has been constantly adapted to changing circumstances and has achieved the necessary flexibility in satisfying the two major, but not always compatible, requirements of *efficiency* and *equity*. The dramatic development of telecommunication services, has seen an increasing demand for spectrum/orbit usage for practically all space communication services. This increase is attributable to many factors. These include not only technological progress, but also political, social and structural changes around the world and their impact on the liberalization of telecommunication services, the introduction of non-geostationary-satellite orbit (non-GSO) satellite systems for commercial communications and scientific and radio navigation applications, growing market orientation, the change in the way this widening market is shared between private and state-owned service providers and the general globalization and commercialization of communication systems.

## 2. The ITU Radio Regulations

### 2.1 Leading international radio regulatory instrument

The ITU Radio Regulations [1], as a leading instrument in the international radio regulatory set-up, are based on the use of two main concepts:

- The concept of block allocations of frequencies that are intended for use by defined radio services -Table of Frequency Allocations (Table) as contained in Article 5 of the RR. This concept generally provides common frequency allocations to mutually compatible services operating with similar technical characteristics in specific parts of the spectrum. It also provides a stable planning environment for administrations, equipment manufacturers and users.
- The concept of voluntary or mandatory regulatory procedures (for coordination, notification and recording) adapted to the allocation structure.

### 2.2 Objectives

The Radio Regulations have the following objectives:

- to facilitate equitable access to and rational use of the natural resources of the radio-frequency spectrum and any associated orbits, including the GSO;
- to ensure the availability and protection from harmful interference of the frequencies provided for distress and safety purposes;
- to assist in the prevention and resolution of cases of harmful interference between the radio services of different administrations;
- to facilitate the efficient and effective operation of all radiocommunication services;
- to provide for and, where necessary, regulate new applications of radiocommunication technology.

### 3. Allocation Structure

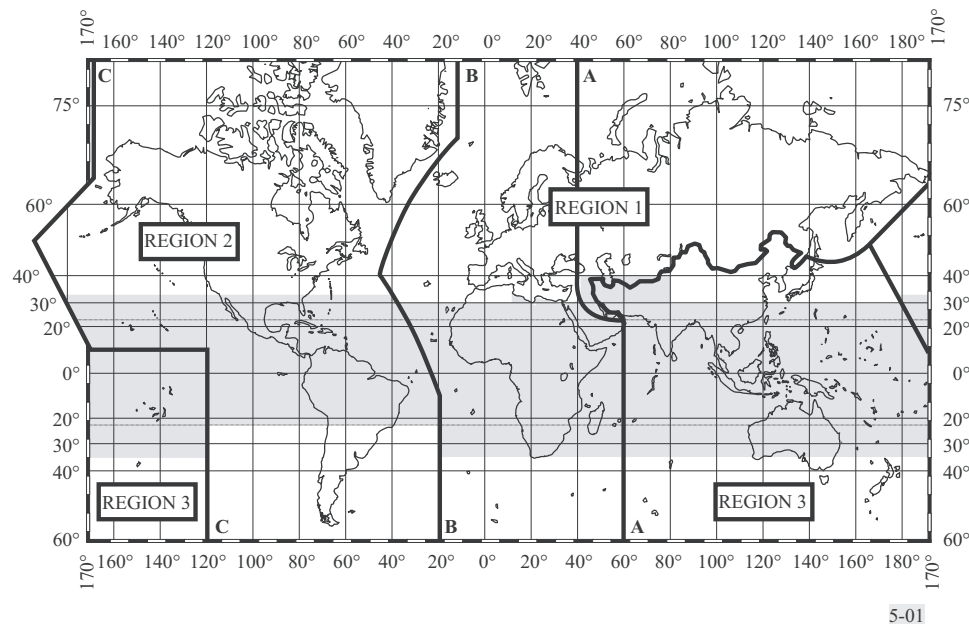
#### 3.1 Allocation structure and principles

The allocation structure (Article 5 of the RR) and associated principles represent a basis for the planning and implementation of radiocommunication services. The current approach is based on a block allocation methodology with footnotes. The regulated frequency band (9 kHz-1 000 GHz) is segmented into smaller bands and allocated to over forty defined radiocommunication services (Article 1 of the RR). The radio services are identified as primary or secondary (the latter shall cause no harmful interference to, or claim protection from, the former) and footnotes are used to further specify how the frequencies are to be assigned or used. The Table is organized into three Regions of the world (see Figure 1) and is supplemented by assignment and allotment Plans for some bands and services, and/or by mandatory coordination procedures.

Fig. 1

#### Regions for purposes of frequency allocation of the RR

The shaded part represents the Tropical Zones as defined in Nos. 5.16 to 5.20 and 5.21 of the RR.



#### 3.2 Type of allocation

Two types of allocation are made:

- *exclusive allocations*, which are favoured in cases that involve broad international use of equipment and practices which imply the need to harmonize relevant operational procedures and technical material in a larger international context. In some cases, the exclusive allocations are subject to a Plan (e.g. in the broadcasting service, the maritime mobile service or the aeronautical mobile service);

- *shared frequency allocations*, which are applied to maximize the use of the available spectrum when two or more radiocommunication services can effectively utilize the same frequency band. The regulatory procedures which govern the use of bands that are allocated to several radiocommunication services, on a shared basis, are based on the use of technical criteria (usually threshold values) which are intended to identify the countries with which coordination is to be effected in order to obtain an acceptable sharing arrangement.

### 3.3 Basic principles related to use of the Table

Using the Table as a starting point, the frequency spectrum management authority of each country selects appropriate frequencies with a view to assigning them to stations of a given service. Before taking the final decision to assign a frequency to a station in a given radiocommunication service in a given frequency band and to issue an appropriate licence, the authority concerned should be aware of all other conditions regulating the use of frequencies in the band concerned, e.g.:

- Are there other mandatory RR provisions governing the use of the frequencies?
- Is the band concerned subject to a pre-established international assignment or allotment Plan? Are the characteristics of the assignment in accordance with the appropriate entry in the Plan? Is there a need to apply the Plan modification procedure prior to issuing a licence?
- Is there a need for effecting the coordination procedure prior to notification of the concerned assignment to the Radiocommunication Bureau (Bureau) or prior to its bringing into use?
- Is the procedure mandatory or voluntary? Is the procedure specified in the RR or in a special agreement?
- Is there a need to notify the frequency assignment to the Bureau, when should such notification be effected, which characteristics are to be notified, what action should be foreseen after the recording or otherwise of the frequency assignment concerned?

## 4. Regulatory Principles Applicable to the Use of Frequencies and Satellite Orbits

### 4.1 Major regulatory mechanism

The specific procedures setting out the rights and obligations of administrations in the domain of spectrum/orbit management and providing the means to achieve *interference-free radiocommunications* have been laid down by successive World Radiocommunication Conferences (WRCs) on the basis of the two main principles referred to above: *efficient use and equitable access*. In order to put these principles into effect, two major mechanisms for the sharing of orbit and spectrum resources have been developed and implemented:

### 4.2 *A priori* planning of the frequency bands

Frequency allotment or frequency assignment Plans represent a key mechanism for preserving the rights of all Member States in the context of *equitable access* to the

limited radio resources (the frequency spectrum and satellite orbit) for *future use*. This concern resulted in the establishment (and introduction into the ITU regulatory regime) of frequency/orbital position Plans in which a certain amount of frequency spectrum is set aside *for future use by all countries*, particularly those which are not in a position, at present, to make use of these resources. These Plans, in which each country has a predetermined orbital position associated with the free use, at any time, of a certain amount of frequency spectrum, together with the associated procedures, guarantee for all countries equitable access to the spectrum/orbit resource, thereby safeguarding their basic rights. Such Plans govern a considerable part of the frequency usage of the most resource-demanding radiocommunication services. Associated with these Plans are Plan modification and notification procedures that provide for the satisfaction of particular operational requirements that are not met by the Plans, while preserving the integrity of the Plans themselves.

### 4.3 BSS and associated feeder-link PLANS and LISTS

#### 4.3.1 Introduction

Appendices 30 and 30A to the Radio Regulations contain downlink Plans for the broadcasting-satellite service (BSS) in the 12 GHz band and the associated feeder-link Plans in the fixed-satellite service (FSS) in the 14 and 17 GHz bands. These Plans are occasionally referred to as the “BSS and the associated feeder-link Plans” and were established with a view to facilitating equitable access to the geostationary-satellite orbit (GSO) for all countries. In Regions 1 and 3 there are also the Lists of additional uses, which are separated from the Plans and annexed to the Master International Frequency Register (MIFR).

The BSS and associated feeder-link Plans and Lists cover the following frequency bands:

Region 1:	11.7-12.5 GHz (space-to-Earth); 14.5-14.8 GHz (Earth-to-space); <sup>1</sup> 17.3-18.1 GHz (Earth-to-space);
Region 2:	12.2-12.7 GHz (space-to-Earth); 17.3-17.8 GHz (Earth-to-space);
Region 3:	11.7-12.2 GHz (space-to-Earth); 14.5-14.8 GHz (Earth-to-space); 17.3-18.1 GHz (Earth-to-space).

BSS and associated feeder-link assignments in these bands have primary status.

#### 4.3.2 Downlink and feeder-link Plans (Appendices 30 and 30A)

##### 4.3.2.1 Downlink Plans

Following the deliberations of two former ITU World/Regional Administrative Radio Conferences (1977 for Regions 1 and 3 and 1983 for Region 2), the 1985 Conference (WARC ORB-85) adopted within an integrated regulatory framework two downlink Plans for the three ITU Regions. There is one downlink Plan for Regions 1 and 3 and another for Region 2. These downlink Plans were included in

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<sup>1</sup> For countries outside Europe.

the former Appendix **30** of the Radio Regulations, subsequently renumbered to Appendix **S30** by WRC-97 and now back to Appendix **30** (i.e. without the “S”) in the current edition of the Radio Regulations.

The Appendix **30** downlink Plans apply to frequency allocations for the BSS in the 12 GHz band. The Regions 1 and 3 Plan is conceptually different from the Region 2 Plan owing to the fact that they were adopted and revised at different conferences, which had different motivations.

The Regions 1 and 3 and Region 2 Plans are presented in a tabular form in Articles 11 and 10 respectively of Appendix **30**. The regulatory procedures associated with the Plans are contained in the Articles of that Appendix. They apply to Plan implementation and modification as well as sharing with respect to terrestrial and other space services in the frequency bands of Appendix **30**. Several technical annexes exist containing sharing criteria, calculation methods, and technical data relating to the Plans.

#### 4.3.2.1.1 Regions 1 and 3 downlink Plan

The Regions 1 and 3 downlink Plan (R1/R3 downlink Plan) covers the frequency bands 11.7-12.5 GHz in Region 1 and 11.7-12.2 GHz in Region 3. It has its origins at the WARC BCSAT 77 Conference and is a detailed *a priori* plan where satellites are generally uniformly spaced in the orbit (usually at 6° spacings) to provide each broadcasting service area with an equal number of 27 MHz channels. Under the Plan, each country was generally given the possibility to make use of five analogue channels on the basis of one beam for national coverage. The Plan had been regarded as “a marvel of engineering ingenuity” however critics found it lacking in commercial viability, claiming that allocating five channels to a single satellite which beams to a single country was not a sound basis for implementation.

The 1997 World Radiocommunication Conference (WRC-97) updated parameters for the Plan in order to modernize it to reflect technological changes. It also added channels for 44 “new countries”<sup>2</sup> and deleted some channels related to countries that have changed their administrative situation in the meantime. While the new parameters facilitated entry of additional capacity in the Plan (through the modification procedure) they still led to a significant increase in the demand for additional channels. WRC-97, in its Resolution 532, resolved to establish an Inter-conference Representative Group (IRG) to study the feasibility of increasing the minimum assigned capacity for countries in the Regions 1 and 3 Plan to around the equivalent of ten analogue channels. The results of these studies were submitted to WRC-2000. They showed that it was possible to increase the capacity of the Plan.

WRC-2000 developed a new Plan that increased the capacity for each country to the equivalent of 10 analogue channels in Region 1 and to the equivalent of 12 analogue channels in Region 3 utilizing digital modulation.

With the uptake of direct satellite broadcasting in Regions 1 and 3 as well as the potential for the future delivery of multimedia services, the WRC-2000 Plan is considered to provide the capacity to meet current and prospective demand. The Plan should secure an economic capacity for each country to take up whenever market conditions are suitable without the fear of a shortage of spectrum in bands

<sup>2</sup> Countries that had administrative or geographical changes.

that are in high demand from rapidly growing space-based systems and a host of other services.

The WRC-2000 Plan for Regions 1 and 3 is for national assignments only. Generally, it cannot be changed except under very limited conditions. All other changes such as modifications to assignments to add more channels, change of beam parameters, etc. will be permitted subject to successful application of the coordination procedure of Article 4 of Appendix 30, and once completed will be included in a "List", called the "Regions 1 and 3 List of additional uses". Assignments in the List must be compatible with assignments in the Plans.

#### 4.3.2.1.2 Region 2 downlink Plan

The Region 2 downlink Plan covers the frequency band 12.2-12.7 GHz. It was adopted at the 1983 Regional Administrative Radio Conference (RARC SAT-83) and incorporated in the Radio Regulations. Its purpose is to provide administrations with channels and orbital positions (based on a non-uniform spacing) to meet their requirements up to the maximum capacity available in the Plan.

It is an *a priori* plan in which a certain degree of flexibility is provided by means of the concept of interim systems that may be implemented with characteristics that can deviate from those contained in the Plan. Another interesting feature of the Region 2 BSS Plan that adds to its efficiency is the group/cluster concept.

The cluster concept was introduced to the Region 2 Plan to overcome internal interference problems caused by reduced cross-polar discrimination between odd and even channels during heavy rainfall. The cluster is simulated in the Plan by using the same beam name at two different orbital positions (usually separated by 0.4 degrees).

The group concept was introduced in the Region 2 Plan to combine grouped assignments in order to allow simultaneous transmissions from one orbital position to several different coverage areas. In general, the internal interference between beams belonging to the same group is ignored. However, when two beams belong to the same cluster, the interfering effect between the two beams is taken into account.

Proposed modifications to the Region 2 Plan are possible and can only enter the evolving Region 2 Plan after they have satisfied all coordination requirements in accordance with Article 4 of Appendix 30 with respect to:

- the Region 2 Plan as it evolves;
- other modifications to the Region 2 Plan not yet coordinated with prior dates of receipt;
- other services in the three Regions having primary allocations in the bands used by the Region 2 Plan;
- the Regions 1 and 3 Plan;
- the existing Regions 1 and 3 List as it evolves; and
- other modifications to the Regions 1 and 3 List not yet coordinated with prior dates of receipt.



#### 4.3.2.2 Feeder-link Plans

The Appendix **30A** feeder-link Plans apply to FSS frequency allocations in the 14 GHz and 17 GHz bands. The feeder-links for both downlink Plans were also adopted at different conferences.

The feeder-link Plan for Region 2 in the frequency band 17.3-17.8 GHz was adopted together with its associated downlink Plan during the RARC SAT 83 Conference and incorporated into the Radio Regulations at the WARC ORB-85 Conference. There is thus direct strapping between Region 2 assignments in the feeder-link and downlink Plans.

Proposed modifications to the Region 2 feeder-link Plan are possible and can only enter the evolving Region 2 Plan after they have satisfied all coordination requirements in accordance with Article 4 of Appendix 30A with respect to:

- the Region 2 Plan as it evolves;
- other modifications to the Region 2 Plan not yet coordinated with prior dates of receipt;
- other services in the three Regions having primary allocations in the bands used by the Region 2 Plan;
- the Regions 1 and 3 Plan;
- the existing Regions 1 and 3 List as it evolves; and
- other modifications to the Regions 1 and 3 List not yet coordinated with prior dates of receipt.

The feeder-link Plans for Regions 1 and 3 (R1/R3 feeder-link Plan) in the frequency bands 14.5-14.8 GHz and 17.3-18.1 GHz were adopted at the WARC ORB-88 Conference, several years after the corresponding downlink Plan was adopted. It was further revised at WRC-97 and WRC 2000 based on the planning principles, technical criteria and assumptions mentioned in Section 2.1.1 above.

All feeder-link Plans and their associated regulatory procedures and technical annexes are contained in Appendix **30A** of the Radio Regulations.

#### 4.3.3 *Downlink and feeder-link Lists for Regions 1 and 3*

The Regions 1 and 3 List of additional uses was created at WRC-2000. The initial List consisted of satellite networks with:

- notified assignments in conformity with Appendices 30 and 30A, which had been brought into use and for which the date of bringing into use was confirmed to the Bureau before 1700 hours (Istanbul time) on 12 May 2000; and
- assignments for which the procedures of Article 4 of Appendices 30 and 30A were successfully completed and for which due diligence information was provided before 1700 hours (Istanbul time) on 12 May 2000, but which had not been brought into use and/or the date of bringing into use had not been confirmed to the Bureau.

There are individual Lists for the downlink and for the feeder-link (14 GHz and 17 GHz). The Lists are separated from the Plans and annexed to the MIFR. Assignments in the Lists must be compatible with assignments in the Plans. The initial Lists were annexed to Resolution **542 (WRC 2000)**.

The Lists are evolving and are updated and published periodically by the Bureau, e.g. when a new network is added to a List.

#### 4.3.3.1 Downlink List

The Regions 1 and 3 downlink List of additional uses (R1/R3 downlink List) was initially presented in a tabular form in Part 1 of Annex 2 of Resolution **542 (WRC-2000)**. The regulatory procedures associated with the List are contained in the Articles of Appendix **30**. They apply to modification procedures as well as sharing with respect to terrestrial and other space services in the frequency bands of Appendix **30**.

Proposed additions or modifications to the evolving R1/R3 downlink List are possible and can only enter this List after they have satisfied all coordination requirements in accordance with Article 4 of Appendix 30 with respect to:

- the R1/R3 downlink Plan;
- the R1/R3 downlink List as it evolves;
- other modifications to the R1/R3 downlink List not yet coordinated with prior dates of receipt;
- other services in the three Regions having primary allocations in the bands used by the Regions 1 and 3 downlink Plan;
- the Region 2 downlink Plan as it evolves; and
- other modifications to the Region 2 downlink Plan not yet coordinated with prior dates of receipt.

#### 4.3.3.2 Feeder-link List

The Regions 1 and 3 feeder-link List of additional uses (R1/R3 feeder-link List) was initially presented in a tabular form in Part 2 of Annex 2 of Resolution **542 (WRC-2000)**. The Regulatory procedures associated with the List are contained in the Articles of Appendix **30A**. They apply to modification procedures as well as sharing with respect to terrestrial and other space services in the frequency bands of Appendix **30A**.

Proposed additions or modifications to the evolving R1/R3 feeder-link List are possible and can only enter this List after they have satisfied all coordination requirements in accordance with Article 4 of Appendix 30A with respect to:

- the appropriate R1/R3 feeder-link Plan;
- the appropriate R1/R3 feeder-link List as it evolves;
- other modifications to the appropriate R1/R3 feeder-link List not yet coordinated with prior dates of receipt;

- other services in the three Regions having primary allocations in the bands used by the appropriate Regions 1 and 3 feeder-link Plan;
- the Region 2 feeder-link Plan as it evolves; and
- other modifications to the Region 2 feeder-link Plan not yet coordinated with prior dates of receipt.

The database containing the technical characteristics and reference situation for all Region 1 and 3 Plan and List assignments and Region 2 Plan assignments can be found on the ITU website at: <http://www.itu.int/en/ITU-R/space/plans/Pages/AP30-30A.aspx>.

#### **4.4 The Fixed-Satellite Service Plan (Appendix 30B)**

##### *4.4.1 Introduction*

Appendix **30B** of the Radio Regulations contains the Plan for the fixed-satellite service (FSS) in the 6/4 GHz frequency bands and in the 13/10-11 GHz frequency bands. This Plan is also referred to as the “FSS Plan” and was established with a view to facilitating equitable access to the geostationary-satellite orbit (GSO) for all countries.

The FSS Plan covers the following FSS frequency bands:

- 4 500-4 800 MHz (space-to-Earth);
- 6 725-7 025 MHz (Earth-to-space);
- 10.70-10.95 GHz (space-to-Earth);
- 11.20-11.45 GHz (space-to-Earth);
- 12.75-13.25 GHz (Earth-to-space),

resulting in a total bandwidth of 800 MHz in each direction. FSS assignments in these bands have primary status.

##### *4.4.2 The Plan and the associated List of assignments*

The FSS Plan was adopted by the World Administrative Radio Conference on the use of the geostationary-satellite orbit and the planning of the space services utilizing it (WARC ORB-88). This FSS Plan is contained in Appendix 30B together with its associated regulatory procedures. Several annexes exist containing criteria, calculation methods, and technical data relating to the Plan.

The World Radiocommunication Conference 2007 (WRC-07) significantly modified the procedures contained in Appendix 30B with a view to improving its efficiency. The characteristics of allotments and technical criteria used in the Appendix 30B examinations were also updated in light of the technology then available.

The FSS Plan is an allotment plan. Each allotment in the Plan comprises:

- a nominal orbital position;
- a bandwidth of 800 MHz (uplink and downlink) as listed in paragraph 1 above;
- a service area for a national coverage.

Characteristics of the national allotments, such as nominal orbital position, ellipse parameters and power-density values, are contained in Article 10 of Appendix **30B**. More details, like the test points associated to each beam, are included in the Appendix **30B** database, which is distributed in the BR IFIC (Space) CD-ROM and can be downloaded from the ITU website at: <http://www.itu.int/en/ITU-R/space/plans/Pages/AP30B.aspx>.

The parameters used in characterizing the Plan can be found in Annex 1 of Appendix **30B**. Each allotment in the Plan is based on C/N values of 21 dB and 15 dB for uplink and downlink respectively under rain-fade conditions and availability of 99.95 per cent for the 6/4 GHz frequency bands and 99.9 per cent for the 13/10-11 GHz frequency bands. In addition, the Plan has been prepared with a view to ensuring for each allotment an overall aggregate C/I value of 21 dB and a single-entry C/I value of 25 dB under free space conditions.

Before the orbital position and frequency resources of an allotment can be utilized by a satellite system, the national allotment has to be converted into an assignment through application of the procedures of Article 6 of Appendix **30B**. The assignments are recorded in the List, and they are entitled to protection against systems received by the Bureau at later date.

Additional systems can also be included in the List after successful application of the relevant procedures of Article 6 of Appendix **30B**. In the context of this Appendix, an additional system is a system for which the assignments are not the result of conversion of an allotment into assignments. When an administration submits an additional system, the allotment of that administration in the Plan is retained.

The detailed characteristics of all the assignments in the List are also included in the above-mentioned Appendix **30B** database.

#### 4.4.3 *Main procedures of Appendix 30B*

##### 4.4.3.1 Article 6 of Appendix 30B

The procedure of Article 6 of Appendix **30B** is applied when an administration submits to the Bureau either: the conversion of an allotment into an assignment, the introduction of an additional system or the modification of an assignment in the List that has already been brought into use.

The Bureau examines the submission to assure that the information received is complete and the data elements are in conformity with the requirements of Appendix **4** and the Table of Frequency Allocations. The Bureau further examines the submission against the limits in Annex 3 of Appendix **30B** as well as other limits contained in Articles **21** and **22** of the Radio Regulations.

Following a favourable finding of the above-mentioned examinations, the Bureau then has to evaluate the impact of the proposed assignments on the reference situation of allotments in the Plan, the assignments in the List and the assignments that the Bureau has previously examined, using the method and criteria of Annex 4 of Appendix **30B**. This examination identifies administrations whose networks are considered to be affected. The Bureau also identifies the administrations whose territories have been included in the service area of the assignments under examination. The submitted information and the names of the above-mentioned

identified administrations are published in a Special Section (AP30B/A6A/) of the BR IFIC together with the relevant database. The notifying administration has to seek the agreement of those identified administrations.

The administration whose networks are identified as being affected (under § 6.5 of Appendix **30B**) should send its comments to the notifying administration (directly or through the Bureau) within four months following the publication of the Special Section. However, the comments regarding the territories included in the service area of the published assignments (the examination results under § 6.6 of Appendix **30B**) can be sent at any time during or after the above-mentioned four-month period.

The notifying administration may request assistance from the Bureau in respect of an administration that is considered to be affected but has not commented within the four-month period after the publication in the BR IFIC. If the identified administration fails to reply within thirty days after the Bureau's reminder, it will be considered as agreeing to the proposed assignment.

When agreements have been reached with all identified administrations, the administration proposing the new or modified assignment may submit the final characteristics of the assignment together with names of administrations with which agreement has been reached. The Bureau then performs similar examinations on the notice as mentioned in the above paragraphs.

If all the examinations lead to favourable findings, the submitted assignment enters into the List and is published in a Special Section (AP30B/A6B/) of BR IFIC. The reference situation of all allotments in the Plan, of the assignments in the List, and of those assignments of Article 6 submissions which are still at the stage of application of that Article, is then updated. The Appendix **30B** database containing the technical characteristics and reference situation of the Plan and List is distributed in the BR IFIC CD-ROM and can be downloaded on the ITU website at: <http://www.itu.int/en/ITU-R/space/plans/Pages/AP30B.aspx>.

If the examinations lead to unfavourable findings, the submission is returned. However, if a notice is returned due to unfavourable findings under Annex 4 of Appendix **30B** examination with respect to assignments, but the findings with respect to the allotments in the Plan are favourable, the assignment can provisionally enter into the List after resubmission of the notice by the responsible administration.

#### 4.4.3.2 Article 7 of Appendix 30B

An administration that has joined the Union as a new Member State and does not have a national allotment in the Plan or an assignment stemming from the conversion of an allotment can obtain a national allotment in application of Article 7 of Appendix **30B**. That administration shall submit its request for an allotment to the Bureau, with the following information:

- the geographical coordinates of not more than 20 test points for determining a minimum ellipse to cover its national territory;
- the height above sea level of each of its test points;

- any special requirement which is to be taken into account to the extent practicable.

The request for a new allotment is processed ahead of submissions received under Article 6 of Appendix **30B** which have not yet been examined. The Bureau proposes appropriate technical characteristics and associated orbital positions for the new allotment and informs the requesting administration, who should respond to the Bureau's proposal within thirty days.

Upon receipt of a reply on the selection of an orbital position and technical parameters from the requesting administration, the Bureau verifies its compatibility with allotments, assignments in the List and the assignments which have been examined, as well as the conformity with the Table of Frequency Allocations and other provisions of the Radio Regulations.

The new allotment is then included in the Plan and published in a Special Section (AP30B/A7/) of BR IFIC if the examinations lead to favourable findings. The reference situation of all allotments in the Plan, assignments in the List and of those assignments of Article 6 submissions, which are still at the stage of application of that Article, is then updated. The Appendix **30B** database containing the technical characteristics and reference situation of the Plan and List is distributed in the BR IFIC CD-ROM and can be downloaded from the ITU website at: <http://www.itu.int/en/ITU-R/space/plans/Pages/AP30B.aspx>.

## **5. Coordination Procedures Applicable to Non-Planned Bands**

### **5.1 Efficient use of the non-planned frequency bands**

Coordination procedures (aimed at *efficiency* in spectrum/orbit use and interference-free operation satisfying *actual requirements*), cover:

- GSO-satellite networks (in all services and frequency bands) and non-GSO-satellite networks in certain frequency bands governed by No. **9.11A** of the RR, which are subject to Advance Publication of Information (API) and coordination procedures;
- the majority of non-GSO satellite networks (all pertinent services and certain frequency bands), for which only the API procedure is required before notification.

### **5.2 The procedures for coordinating the use of frequencies**

The procedures for coordinating the use of frequencies represent a basic component of the international radio regulatory set-up, as they enable the implementation of new radiocommunication systems while avoiding harmful interference with regard to other existing and planned users. In essence, coordination is a bilateral or multilateral process conducted between administrations comprising the following activities:

- identification of the administrations whose assignments are likely to be affected and with which coordination must be sought or agreement obtained;
- use of standardized methods for calculating the potential for interference;

- application of standardized steps in well-defined and transparent procedures of the RR comprising, inter alia, the exchange of data elements in a prescribed RR Appendix 4 format, communicating comments within a prescribed period, and, when appropriate, publication of the results of the coordination procedure in the special section of the Bureau's International Frequency Information Circular (BR IFIC).

These procedures are streamlined in Article 9 and linked to Article 11 of the RR. They are based on the principle of "*first come — first served*". The successful coordination of space networks or earth stations gives a recording in the MIFR and international recognition to the use of frequencies by those networks/stations as described in Article 11 of the RR.

The relevant procedures involve three basic steps:

- API (Section I, Article 9);
- Coordination (Section II of Article 9);
- Notification (Article 11).

### 5.3 Advance Publication of Information

The aim of the API procedure prescribed under Section I of Article 9 of the RR is to inform all administrations of any planned satellite system using a GSO or a non-GSO satellite and of its general description. This *mandatory* ("starting a clock") procedure provides a formal mechanism whereby any administration can make a preliminary assessment of the effect that a planned satellite network is likely to have on the stations of existing or planned satellite systems and their terrestrial stations in certain frequency bands and comment accordingly. To this end, the administration responsible for the planned satellite network has to submit to the Bureau, for API/A publication in the BR IFIC, the API data stipulated in Appendix 4 to the RR not sooner than seven years and preferably no later than two years before the planned date of bringing into use of the network or system.

If, upon receipt of the BR IFIC containing the API/A special section published under No. 9.2B of the RR, any administration considers its existing or planned satellite systems or networks or terrestrial stations to be affected, it may send its comments to the publishing administration, so that the latter may take those comments into consideration when initiating the coordination procedure. A copy of these comments may also be sent to the Bureau. Thereafter, both administrations shall endeavour to cooperate in joint efforts to resolve any difficulties, with the assistance of the Bureau if so requested by either of the parties, and shall exchange any additional relevant information that may be available.

### 5.4 Coordination procedure

Coordination is a further step in the process leading up to notification of the frequency assignments for recording in the MIFR. This procedure is a formal regulatory obligation both for an administration seeking to assign a frequency in its network and for an administration whose existing or planned services may be affected by that assignment. An agreement arising from this coordination confers certain rights and imposes certain obligations on the administrations concerned; as such, coordination must be effected in accordance with the relevant regulatory

procedures laid down in the RR and on the basis of technical criteria either contained therein (Appendix 5) or otherwise agreed to by the administrations concerned.

In accordance with No. 9.6 of the RR, before an administration notifies to the Bureau under Article 11 or brings into use a frequency assignment to a space station, an earth station intended for communication with a space station, or a terrestrial station within the coordination area of an earth station, it must effect coordination of the assignment, as required, with any other administration whose space, earth or terrestrial station frequency assignments are likely to be affected. The frequency assignments to be taken into account in effecting coordination or seeking an agreement are identified using the criteria in Appendix 5. The coordination may be undertaken on a "network basis" using the information relating to the space station, including its service area, and the parameters of one or more typical earth stations located in all or part of the service area; or on the basis of individual frequency assignments to a space station or an earth station.

In the above cases, the Article 9 procedure requires such coordination with any administration responsible for a frequency assignment to a space station, to an earth station that communicates with such a space station, or to a terrestrial station situated in the same frequency band as the planned assignment, pertaining to the same service or to another service to which the band is allocated with equal rights or a higher category of allocation, which:

- is in conformity with the Convention, the Table and the other provisions of the RR; and
- is recorded in the MIFR with a favourable finding; or
- is coordinated under the provision of Article 9; or
- is included in the coordination procedure with effect from the date of receipt by the Bureau of the characteristics specified in Appendix 4; or
- where appropriate, is in conformity with a world or regional allotment or assignment Plan and the associated provisions; or
- for terrestrial stations, is operating in accordance with the RR, or is to be so operated within the next three years from the date of publication of the coordination request, and:
- is considered to affect or be affected, as appropriate, having regard to the threshold levels and conditions given in Tables 5-1 and 5-2 of Appendix 5.

The threshold levels and conditions given in Tables 5-1 and 5-2 of Appendix 5 differ according to the specific cases of coordination. For example:

- for non-GSO (Nos. 9.12 and 9.13), coordination is based on frequency overlap, as for non-GSO/terrestrial stations for the frequency bands covered by No. 9.11A.

For frequency bands in the range 1 to 3 GHz (space-to-Earth) covered by No. 9.11A, in addition to the overlap condition, coordination of non-GSO systems is required with respect to terrestrial stations if the pfd produced at the Earth's surface (by non-GSO system) or the fractional degradation in performance (FDP) of a



station in the fixed service exceeds the threshold values given in Annex 1 to Appendix 5.

Finally, the Bureau will publish the complete information (Appendix 4 information and, as appropriate, the names of identified administrations with which coordination may need to be effected), in a CR/C special section of its BR IFIC.

## **6. Notification and registration procedures**

### **6.1 The Master International Frequency Register**

The MIFR represents one of the pillars of the international radio regulatory set-up as it contains *all frequency usage notified to ITU*. It should be consulted before selecting a frequency for any new user. For these reasons, *notification of frequency assignments to the Bureau, with a view to their recording in the MIFR, represents an important obligation for administrations, especially in respect to those frequency assignments that have international implications.*

### **6.2 Notification procedures**

The process of notification of frequency assignments has been streamlined by the revisions of the RR by all recent WRCs, and the relevant provisions are contained in Article 11. In order to keep the process workable, the RR specify quite precisely what should be notified, when the notification information is to be submitted to the Bureau and what information has to be submitted.

According to these provisions, any frequency assignment liable to have an international implication has to be notified to the Bureau (*This notice shall reach the Bureau not earlier than three years before the assignments are brought into use*). In other words,

- if an assignment liable to cause interference to existing or future stations in another country or to suffer interference from such stations; or
- if that assignment is to be used for international radiocommunication; or
- if that assignment is subject to the Article 9 coordination procedure or is involved in such a case; or
- if it is desired to obtain international recognition for that assignment; or
- if it is a non-conforming assignment and if the administration wishes to have it recorded for information

it should normally be notified (submitting its relevant characteristics, as specified in Appendix 4 of the RR) to the Bureau. The Bureau shall publish the notice in PART I-S of the BR IFIC, thereby ensuring that all administrations are informed of the use of the assignments and that they are taken into account in any future planning conducted at the national, regional or international level.

### **6.3 Notification examination by the Bureau and recording in the MIFR**

The subsequent processing of a notice varies according to the frequency band and service concerned. Each notice is first examined with respect to its conformity with the Table and the other provisions of the RR (regulatory examination); this examination consists in checking that the assignment (frequency, class of station,

notified bandwidth) does indeed correspond to an allocation in the Table or the footnotes thereto and, where appropriate, that it complies with other technical or operating conditions laid down in other articles or appendices of the RR (power limits, authorized classes of emission, minimum elevation angle, etc.). If the result of this examination is *unfavourable* and the administration concerned has not explicitly undertaken that the assignment shall be operated subject to not causing interference to assignments operating in conformity with the RR, making reference to No. 4.4 of the RR, the examination stops there and the notice is returned to the notifying administration after publication of the finding in *PART III-S of the BR IFIC*.

When the result of the first examination (under No. 11.31 of the RR) is favourable, the assignment is recorded in the MIFR, or examined further, if appropriate, from the viewpoint of its conformity with the coordination procedures (No. 11.32 of the RR) or with a world or regional allotment or assignment Plan (No. 11.34 of the RR).

Following such examinations, the assignment is either recorded in the MIFR and published in *PART II-S of the BR IFIC* (if the finding is *favourable*), or is published in PART III-S of the BR IFIC and returned to the administration (if the finding is unfavourable). The administrations are normally advised to complete the coordination procedure with the identified administrations, or to apply the relevant Plan modification procedure. However, in some specific cases an administration may resubmit the notice without completing the coordination or Plan modification procedure and the concerned assignment may be recorded in the MIFR under specific conditions.

#### **6.4 Responsibilities of the notifying administration after recording in the MIFR**

Recording in the MIFR does not mean the end of activities for the notifying administration as regards the concerned frequency assignment. The notifying administration should remain in close cooperation with the licensing authority and satellite operator and any change in the characteristics of the concerned assignment has to be notified to the Bureau so as to be reflected in the MIFR, if necessary following additional coordination with the administrations of other countries concerned.

Furthermore, the notifying administration should remain in close contact with the monitoring authority so as to check whether the concerned frequency assignment is operated in compliance with the notified characteristics and whether other elements (e.g. frequency tolerance) are kept within the limits prescribed by the RR. The notifying administration should also initiate appropriate monitoring programmes with a view to detecting any operational or technical irregularities in the operation of frequency assignments pertaining to other administrations, and to initiate appropriate actions in this regard, so as to ensure *interference-free operation* for stations under its jurisdiction.

#### **7. Assistance to Administrations**

The RR contains specific provisions in Article 13 relating to the provision of assistance to administrations in the application of the radio regulatory procedures, in particular to those administrations in need of special assistance concerning:

- application of the procedures of Articles 9 and 11;

- studies and recommendations in resolving a case of harmful interference;
- studies and recommendations in resolving a case of alleged contravention or non-observance of the RR.

## 8. References

[1] ITU Radio Regulations, Edition of 2008, printed in Switzerland, Geneva, 2008, ISBN 92-61-12451-8

[2] The BR International Frequency Information Circular (Space Services) (BR IFIC) is a service document, published once every two weeks by the Radiocommunication Bureau in accordance with provision Nos. 20.2 to 20.6 and No. 20.15 of the ITU Radio Regulations: <http://www.itu.int/ITU-R/go/space-brific/en>

[3] Space Network List (SNL) — Reference List of regulatory publications concerning planned or existing space stations, earth stations and radio astronomy stations: <http://www.itu.int/ITU-R/space/snl/index.html>

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